



**Asia-Pacific
Economic Cooperation**

Energy Efficiency Finance in Indonesia

Current State, Barriers and Potential Next Steps

APEC Energy Working Group

August 2017



**Asia-Pacific
Economic Cooperation**

Energy Efficiency Finance in Indonesia
Current State, Barriers and Potential Next Steps

APEC Energy Working Group

August 2017

APEC Project: EWG 14 2016A

Produced by

Verena Streitferdt (PhD)
Synergy Efficiency Solutions
Jl. Sekuta, Sanur, Denpasar Sel., Bali 80228, Indonesia
Tel: +62 361 271292
Email: info@energyefficiency.solutions
Website: www.synergyefficiency.solutions

Fabby Tumiwa
Institute for Essential Service Reform (IESR)
Kompleks Bappenas No. R-13, Jalan Mampang Prapatan VII, Jakarta 12790, Indonesia
Tel: +62 217992945
Email: iesr@iesr.or.id
Website: <http://iesr.or.id/>

For

Asia-Pacific Economic Cooperation Secretariat
35 Heng Mui Keng Terrace
Singapore 119616
Tel: (65) 68919600
Fax: (65) 68919690
Email: info@apec.org
Website: www.apec.org

© 2017 APEC Secretariat

APEC#217-RE-01.16

Acknowledgements:

We would like to thank APEC for funding this research and Climate Works Australia for commissioning this work. Especially, we would like to thank Climate Works Australia for their knowledge and expertise in finalising the report, in particular Annie Schultz and Eli Court. Also, we would like to thank all the interviewees for their input, in particular, the government representatives from the Ministry of Energy, Ministry of Finance and OJK. Also, we extend our gratitude to the Green building council Indonesia, PT. Prime Consultancy and all the other financial institutions and private sector representatives who shared their knowledge with us.

Table of contents

Executive Summary	4
Section I: Energy Efficiency Finance: Definition	8
1.1. Private Energy Efficiency finance models	8
1.2. Barriers at the Project level	9
1.3. Barriers resulting from broader framework conditions	11
1.4. Public/Private EEF mechanisms	12
Section II: Current State of EEF in Indonesia	15
2.1. Key findings	15
2.2. Existing private EEF models	15
2.3. Public/private EEF mechanisms in Indonesia	17
Section III: Important stakeholders and specific barriers	20
3.1. Financial institutions	21
3.2. Project developers/ESCOs	22
3.3. Commercial building owners	22
3.4. Indonesia's national and local governments	23
3.6. International development organisations	25
Section IV: Potential Next Steps	26
References	29
APPENDIX I: List of abbreviations	31
APPENDIX II: List of Interviewees	33
APPENDIX III: Key Actor in energy efficiency finance in Indonesia	34

Executive Summary

Why is Energy Efficiency Finance important for Indonesia's built environment?

Indonesia's built environment has a crucial role to play in meeting the nation's energy demands and emission reduction commitment. Indonesian cities are growing at a fast rate and will house 68% of Indonesia's population by 2025.¹ The potential for reducing Indonesian buildings' emissions by improving their energy is significant, and Indonesia has the second largest market for energy efficiency implementation in the ASEAN region². Overall, between 10 to 30% of energy could be saved in the industry, transport, household and commercial sector.³ Further, there are good reasons for government to support EE financially, because it (a) reduces pressure on energy systems; (b) builds energy productivity and economic competitiveness and (c) reduces greenhouse gas emissions.

On the 6th of October 2015, the Indonesian Australian Commercial Building Collaboration held a workshop in Jakarta with key stakeholders from the Indonesian built environment (see participants list in Appendix III) to identify barriers to energy efficiency improvement in the commercial building sector, and identify projects to overcome these. Workshop participants designed 6 projects, including a project to map barriers to energy efficiency finance in Indonesia's buildings sector, and identify potential solutions to overcome these barriers and accelerate energy efficiency finance – this discussion paper aims to progress this project idea.

Report objectives

This discussion paper aims to create a clear overview of energy efficiency finance (EEF) initiatives for the commercial building sector in Indonesia to provide a clear picture of current barriers and gaps for action. This will assist those working to accelerate EEF in the commercial building sector in Indonesia. The paper:

- Provides an overview of the existing public and private EEF initiatives in the commercial buildings sector and relevant stakeholders in Indonesia;
- Identifies key barriers preventing energy efficiency finance in the commercial building sector;
- Identifies potential opportunities for the acceleration of EEF in the commercial buildings sector in Indonesia in the short and the longer term.

1. (World Bank, 2016).

2. (Carbon & Programme 2015)

3. (Hutapea 2014)

Interviews and literature review were the main sources for the findings. (see Appendix 1).

Key findings

This report found that despite several initiatives to accelerate energy efficiency finance in the commercial building sector (see section II), its availability is still limited. This limits the size and extent of energy efficiency (EE) refurbishments and energy efficient new builds. At the moment, energy efficiency projects in the commercial buildings sector can be funded by:

Private finance:

- Internal capital from the building owner;
- Bank loan through an existing credit line from the building owner;
- Limited ESCO finance (provided by a third-party investor and arranged by an ESCO company);

Public/private blended finance:

- Japanese Joint Credit Mechanism (JCM), which provides 50% grant finance to support GHG reduction projects – projects must find the remaining 50% from private sources;
- Public finance/financial incentives;
- Tax incentives for green building constructions in some Indonesian cities (e.g. Bandung).

However, utilisation of these (and other potential) forms of finance remain limited. Barriers that limit additional financing of EEF in the commercial buildings sector vary for each of the key stakeholders involved. These are summarised below, with more detail on each provided in section 3:

Barriers for financial institutions:

- Financial credit regulations, established to protect against risky lending practices, are not well suited for clean energy finance, in particular because they do not recognise the cash flows from energy savings as acceptable collateral;
- Lack of access to reliable information to enable appropriate risk assessments for EE projects (e.g. reference projects; information about EE technologies and their performance; experience with EE service providers);
- Transaction costs are too high due to limited project pipelines and EE projects that are too small.

Barriers for energy efficiency consultants/project developers:

- Limited access to third party finance (due to above mentioned reasons);
- Limited capacity amongst some consultants/project developers to prepare 'bankable' business cases.

Barriers for commercial building owners:

- EE is not seen as core business and standard company investment guidelines require internal rates of return (IRR) which are too high to make EE projects viable (>20%);
- A lack of comfort with entering into off-balance sheet financed projects with EE project developer's due to a lack of reference projects and experience with these service providers.

Potential solutions to unblock those barriers and enable the acceleration of energy efficiency finance in the Indonesian commercial buildings sector could include:

In the short-term:

- Use running concessional funding from the Asian Development Bank (ADB), the Agence Française de Développement (AFD) and Joint Crediting Mechanism (JCM) to create reference projects that target EE in the commercial building sector. For example, currently AFD supports PT. SMI, which is a state-owned infrastructure financing company, with a credit line to support low carbon investments and it could be discussed whether a project pipeline for retrofits in commercial buildings could be developed;
- Capacity building for EE project developers regarding project pipeline preparation and formulation of bankable project proposals;
- Establish incentives for building owners (e.g. green tax incentive of Bandung);
- Develop a technology benchmarking mechanism to provide reliable information for building owners and financial institutions regarding EE technologies;
- Investigate how financial guidelines could be adapted to be more conducive for EE finance.

In the longer-term:

- Develop financial risk reduction mechanisms such as guarantee/insurance to improve access to finance for energy consultants and project developers;
- Develop long-term concessional finance via a public fund to finance energy efficiency projects in Indonesia directly, using potential financiers like the Green Climate Fund (GCF), AFD, International Finance Cooperation (IFC), ADB;
- Consider mandatory sustainable investment practices that require financial institutions to invest into green projects.

These findings and potential solutions will be further discussed at the Incubator stakeholder forum in Jakarta on 8 August.

Section I: Energy Efficiency Finance: Definition

Energy Efficiency finance (EEF) refers to finance being made available to fund energy efficiency projects such as the retrofit of a commercial office block.

1.1. Private Energy Efficiency finance models

Error: Reference source not found shows how diverse private EEF models for commercial buildings can be. They can be categorised according to the facilitator or key 'actor', the intended customer, and the project sizes to which they can be applied.

Table 1: Overview of possible private EEF models, defined by the actors, customers and project size

EEF Model	Description	Actor	Customer	Examples		
				Project Size	APEC member economy	Reference
EE loans	The customer takes out a loan from a bank for EE retrofits and new EE buildings	Banks	Large commercial building and industry	US\$20 million	Thailand	(International Energy Agency 2010b)
Green bonds	Property developer can issue green bonds and use finance for EE retrofit/ new building	Utilities; Building Owners; Government fin. institutions	Commercial buildings	100-500 Mio USD\$ for 10 year bond	Hong Kong, China	(Radschinski 2016) (Link 2017)
ESCO-arranged finance	The ESCO firm provides the finance for the EE retrofit and receives payment from the customer's energy savings.	Energy Service Companies	Public sector or large commercial/industry	Average US\$ 115.000 Thailand: 140.000 US\$ to 420.000 US\$.	Thailand, India and China	(Limaye et al. 2012; Taylor 2012)
EE leasing	The customer pays monthly leasing fees to a leasing institution until the investment has been paid off.	Leasing Companies	Commercial building, SMEs	China: US\$50.000 Thailand: US\$20.000	China, Thailand	(MacLean & Purcell 2014)
Secondary markets	Equity investors or foreign investors provide equity for the projects.	Equity funds	Banks, ESCOs	US\$100-200 million	Indonesia	(MacLean & Purcell 2014)

Overall the implementation of EEF models in the Asian context is still limited. For example, while the Asian Development Bank (ADB) invested \$211 billion in clean energy globally in 2011 (of which \$59 billion was in Asia and the Pacific), only 11% of the total (US\$23.9 billion) was invested in “energy-smart” technologies such as energy efficiency systems and devices (ADB 2013). The literature identifies both barriers at the project level, and barriers created through the absence of necessary enabling ‘framework’ conditions. These are discussed further below.

1.2. Barriers at the Project level

Key barriers at the project level are identified in Figure 1 below. These include:

- **Availability of Funds:**
The internal lending credit policies of banks are often strict and exclude ESCO companies from obtaining funding - domestic ESCO companies often have weak balance sheets and lack the collateral required by banks.⁴ Also, banks tend to lend only to existing customers which makes it difficult for new customers, such as energy service companies (ESCOs) to get access.⁵
- **Information, Awareness and Communication:**
Financiers often lack access reliable knowledge on the performance on EE technologies and even lack access to energy consumption data of buildings and industries to enable benchmarking and measurement of the impact of EE projects (Kolstad 2016). In emerging countries, where EE technology is new and mainly imported, knowledge and information is limited and often out of date. Generally, awareness on financing options for EE is low. Finally, project developers often lack the skills and knowledge needed to convince the CEOs of property companies that EE investments are an important business area.
- **Project development and transaction costs:**
EEF projects are usually small in volume and require complex financing structures. EE projects need relatively small investments, which limit possible profits or necessitate a certain level of aggregation to appeal to financing institutions. A multitude of actors are involved in EEF projects, however in developing and emerging economies where markets are new, trust has yet to mature between the different stakeholders. For example, international ESCOs lost interest in investment in India after they recognised the high amount of capacity building that would have been necessary to convince potential customers to enter into contractual arrangements.⁵
- **Risk perceptions:**
Risk for EE projects is perceived high as besides the lack of knowledge on EE technologies, also EEF requires a different approach, as funding comes from 'invisible' resource savings. The asset cannot be refinanced via the sale of its products (energy efficiency savings) and this is a problem under conventional investment strategies.
- **Limited capacity:**
Loan officers and risk managers within financial institutions lack knowledge on EE technologies or on energy performance contracting. On the other side, project developers and ESCO firms lack capacity to develop financial attractive project proposals.⁶

1. (World Bank, 2016).

2. (Carbon & Programme 2015)

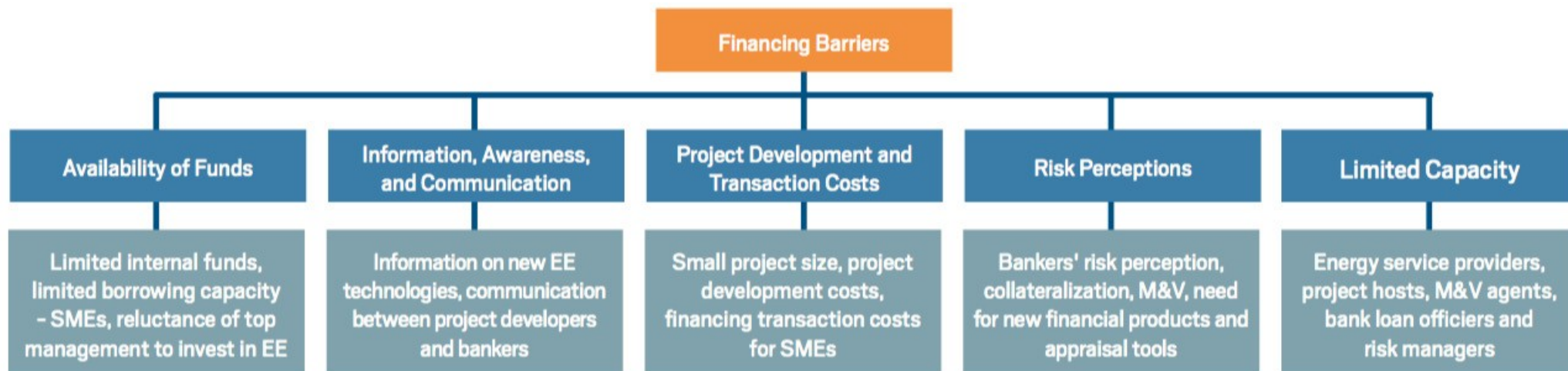
3. (Hutapea 2014)

4. (Kolstad 2016)

5. (Taylor et al. 2008)

6. (Limaye et al. 2012)

Figure 1: Financing barriers to demand-side energy efficiency (Limaye et al. 2012)



Source: Compiled by authors based on review of IEE studies and programs and interviews with IEE experts.

1.3. Barriers resulting from broader framework conditions

At a higher level, a range of enabling conditions are required in order to deliver optimal energy efficiency. These include:

- Enabling conditions in the energy sector;
- Enabling conditions in the finance sector;
- The broader governance framework of the country in question.⁵

The absence of these enabling conditions can prevent investment in energy efficiency projects. Key barriers of this kind include:

Energy sector:

- Low energy prices, which reduce the financial attractiveness of energy efficiency projects;
- A lack of EE potential in the commercial building sector;
- A lack of EE targets from the government;
- A lack of ready available EE technologies;
- A lack of efficiency targets and standards;
- Divergent priorities between governments and international donor agencies⁵

5. (Taylor et al. 2008)

Finance sector:

- Lack of capital in the financial markets;1
- Lack of a banking sector, with experience in small-scale financing;2
- On-lending regulations are not conducive with of EEF requirements (e.g energy savings as collateral);
- Banks are hesitant to invest due to missing sustainable finance guidance form central banks or other government institutions.3

Broader governance framework:

- Governance disruptions in emerging and developing economies can also hinder EEF 4.
- Problems in cross-ministerial coordination for enforcing EE standards and targets.

1.4. Public/Private EEF mechanisms

The focus of this paper is on the project-level barriers noted in section 1.2 above. Governments and international development organisations/finance institutions have identified a range of mechanisms at the project level designed to help overcome these barriers and increase private sector investment into EE. These are summarised in ¹⁰ and include:

- Financial incentives/grant mechanisms;
- Blended public/private EEF mechanisms.

Besides the development of the mechanisms themselves, intensive capacity building is required to motivate important stakeholders to use these. In addition, governments need to consider further supporting EEF by improving the important above-mentioned framework conditions.

5. (Taylor et al. 2008)

7. (DeT'serclaes 2010; Taylor et al. 2008)

8. (Wattana & Vaiyavuth, 2007)

9. (Taylor 2012)

10. (Streitferdt 2016a)

Table 2: Overview of EE financial mechanisms and public/private EE finance mechanisms

EEF Model	Description	Actor	Customer	Examples		
				Project Size/funding	APEC member economy	Reference
Financial incentives/grant programmes						
Tax incentive	Tax office provides corporate or income tax benefits	Board of investment, tax office	ESCOS, commercial buildings	N/A	Thailand	(IIP(Institute for Industrial Productivity 2015))
Public/private finance mechanisms						
Technology subsidy	Government pays for a certain percent of the EE technology investments	Government, institutions for technology standards	Commercial building owners, industry	Funds: Gov.: 3 Mio USD\$ private: 9.5 mio US\$	Thailand	(APEC 2005)
Energy saving certificates	Government requires companies to reduce EE consumption; units of energy reduction can then be traded	Ministry of Energy	Industry, commercial buildings	India: 5.4 US\$ billion	India	(Crossley et al. 2012) (Upadhyaya 2010)
Energy efficiency revolving funds	Government provides funds to banks that on lend these funds for EE investors from customers	Ministry of Energy, Ministry of finance	Industry, commercial buildings	Gov.: 1.5 US\$/project Gov.: 200 Mio. US\$ banks: 270 mio US\$	Thailand	(APEC 2005)
Concessional credit lines	Development banks provide funds to banks to develop credit lines specifically targeted to EE finance	Development banks, Ministry of Finance	Industry and commercial buildings	10-20. Mio Euro	Europe	Selmet 2010
ESCO support/ Super ESCO	Government supports institutions who act as ESCO firms and develop EE projects	Ministry of Energy, international organisations	Industry, commercial buildings sector	N/A	China	(Dixon et al. 2011)
Utility based finance	Government orders utilities to reduce energy consumption and these provide projects to customer to finance EE projects over time via energy bills	Ministry of Energy and Utilities	Residential sector	USD 0.003/kWh to 0.007/kWh	China	(Crossley et al. 2012) (MacLean and Prucell 2014),

Section II: Current State of EEF in Indonesia

This section builds on the previous sections by reviewing the current state of energy efficiency finance in Indonesia, including:

- Existing private EEF models;
- Existing public support mechanisms.

2.1. Key findings

Deployment of EE finance in the commercial building sector in Indonesia is still limited. Currently the available options to fund energy efficiency projects in Indonesia are:

- Internal capital from the building owner
- Bank loan through an existing credit line from the building owner
- Bank loan via a project developer
- Limited ESCO finance (provided by a private investor and arranged by an ESCO company)

Reviewing the existing public/ private EEF mechanisms and financial incentives it was found that despite numerous public sector efforts to support EEF (mostly driven by international donor agencies), most of the mechanisms have faced significant challenges and delivered limited impact to date.

2.2. Existing private EEF models

Overall available private finance models are limited and mostly restricted to building owner finance or bank loans. Interviewees confirmed that EE projects in new commercial buildings are usually funded by the building owner themselves, either through their own funds or existing credit lines from banks¹¹. For EE retrofits, some projects are funded by loans from project developers or ESCOs, and some examples of ESCO/Project developer finance are provided in Table 3. For bank loans project developers are required to provide 30-50% of the needed equity.¹⁶ No examples of other private mechanisms such as the usage of green bonds or EE leasing could be identified.

11. (1_PD; 19_PD).

16. (4_PD)(Carbon & Programme 2015)

Table 3: Experiences of private sector models that could be found in Indonesia ¹⁷

Type of finance EEF model	Description	Actors and customers	Project size	Comments
Loan by the Project developer (ESCO finance) ¹⁸	Was used to retrofit floors with new cooling devices in an office building	Office buildings	700 Mio RP (70.000 US\$)	Only did one floor and achieved 10% savings which was the companies target...no other floors retrofitted.
Loan by the Project developer	Retrofitting of lighting and cooling in a grocery store	Project developer and Medium sized grocery store	3.5 Billion Rp. 300.000 US\$	Rolling capital of the ESCO was used. New funding every six months (up to 15 buildings).
ESCO Finance	Retrofit the building envelope	ESCO firm/ Mall	Less than 1 Mio. USD	Not financed yet
ESCO finance	Retrofit an apartment building with EE lights	Apartment	7.7. bio. RP (750.000 US\$)	The ESCO received funds from a private investor. The project runs over 3 years (simplified EPC contract). The interest rate is 16%
ESCO finance	Commercial buildings (telecommunications) are retrofitted	State owned enterprise subsidiaries	16.5 Billion RP (1.2 million US\$)	Project is funded via private investors over 8 years with a 16% interest rate. Every year 5 more buildings are added until they reach 20 buildings.

2.3. Public/private EEF mechanisms in Indonesia

Many public/private EEF mechanisms have been developed in Indonesia (see Table 4). As

Error: Reference source not found below indicates, most efforts focus on the development of public/private EEF mechanisms, with a focus on the barriers Availability of Funds and Capacity Building (mainly for project developers and financial institutions). However, at the moment only one public/private EEF mechanism (the Joint Crediting Mechanism – see Figure 2) is currently providing finance to EE projects in the commercial building sector – others have been discontinued or are not supporting EE projects in this sector. One interesting financial incentive was provided by the city of Bandung, which offered tax advantages to building owners whose developments complied with green buildings standards.

16. (4_PD)(Carbon & Programme 2015)

17. Based on interviews conducted in Indonesia (4_C; 1_PD; 8_PD). Thus, this is not a comprehensive survey of the situation but rather a snap shot of the current situation.

18. (1_PD)

Table 4: Private/public blended support mechanism and financial incentives in Indonesia

Initiatives	Type of Support	Period	Implementer	Result/Status	Barrier
Private/public EEF mechanisms					
1. Joint Crediting Mechanism (JCM)	Technology subsidy: 50% subsidy for GHG mitigation projects	2013–present (ongoing)	Japan; building owner, project developer	Two energy savings projects in commercial buildings (up to 2016)	Availability of funds
2. Policy loan programme/ EE accelerator programme	Concessional credit lines Technical assistance	Ongoing	ADB; Ministry of Energy and mineral resources	Contributed to the ESCO law; Contributes to IGA trainings	Project development and transaction costs
3. ESCO programme	ESCO support/ Super ESCO: Technical assistance	Ongoing	AfD; ESCO firms; PT.SMI	Support ESCO companies to develop projects; supports PT.SMI for project development	Project development and transaction costs
4. Clean energy information and communication centre (LINTAS)	General EE finance Collection of information on	Ongoing	Danish embassy; MEMR	The Danish Embassy is providing one more year of finance.	Information, awareness and communication
5. Green building programme	General EE finance Technical assistance	Ongoing	IFC; DKI Jakarta; MEMR	EDGE software implementation (cost estimation for retrofits in buildings. in DKI Jakarta, Bandung and Surabaya)	Limited capacity
6. Concessional loan to EXIM bank	Concessional credit lines: Financial incentive	Stopped in 2016	ADB; banks; EXIM bank	Limited impact: two projects were financed and the scheme has been closed down.	Availability of funds
7. EE Concessional loan	Concessional Credit line:	Stopped in 2016	AfD; MEMR; project dev.	Bank Mandiri concessional lending. The credit line was closed in 2016 without any projects being financed.	Availability of funds
8. EE revolving fund	EE revolving fund: Technical assistance	2011-2013	Carbon trust, UNDP, MEMR, MoF	Develop a concept and programme for a revolving fund. Via PIP mechanism Due to government changes it was not approved.	Availability of funds
9. IEPCI and IEPCII	Concessional credit line: Financial incentive	Finished in 2012	KfW, MEMR	Loans were provided for EE technology.	Availability of funds
10. EEF capacity building programme	Super ESCOs: Free IGAS	ongoing	MEMR, AfD	IGA training of 10 industries. They IGAs were for free	Limited capacity

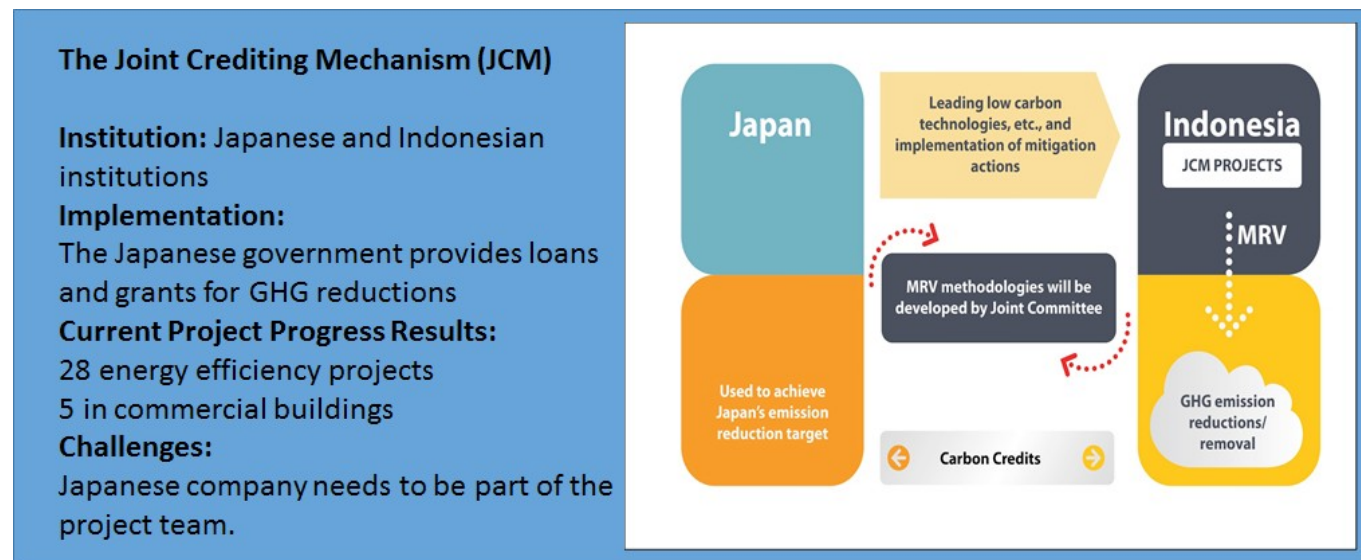
Table 4: Private/public blended support mechanism and financial incentives in Indonesia

Initiatives	Type of Support	Period	Implementer	Result/Status	Barrier
Framework conditions					
11. Indonesian financial support (INFIS)	Technical assistance	Ongoing	GIZ, OJK	Provide technical assistance to OJK for example to conduct a project finance analysis.	Risk perception
12. First movers programme	Technical assistance	2016– July 2017	OJK; Environmental NGO	Drafted the sustainable investment guidelines. Follow up programme has started.	Limited capacity
Financial Incentives					
13. Green Chiller	Financial incentive	2014- present	MEMR GIZ	Conducted a study on financial incentives for EE cooling systems	Conducted a study on financial incentives for EE cooling systems
14. Green Building Code implementation	Tax incentive	2012- present	Ministry of Public Works, city of Bandung; city of Surabaya	Green commercial buildings can get some tax benefits. However, the operationalisation is still being developed.	Green commercial buildings can get some tax benefits. However, the operationalisation is still being developed.

Table 5: Overview of public initiatives and which barriers they address

Public initiatives	Barriers targeted				
	Barrier 1: Availability of Funds	Barriers 2: Information, Awareness and communication	Barrier 3: Project development and transaction costs	Barrier 4: Risk perception	Barrier 5: Limited capacity
Total #	7	1	2	1	3

Figure 2: Brief overview of the Joint Crediting Mechanism (JCM)



Section III: Important stakeholders and specific barriers

One of the objectives of this study was to identify the key stakeholders relating to EEF in Indonesia, and map the key barriers to each of these stakeholders. Figure 3 identifies each stakeholder group, the type of initiative they have been involved in, and identifies key stakeholders within each category. Each of these stakeholder groups, and the barriers they experience in relation to EEF, are discussed in more detail below.

Figure 3: Important stakeholders for EEF

	Domestic Bank	Project Dev./Escos	Building Owners	Government	NGOs	Interantional Organisations
Policy Development	Bank of Indonesia	SES, METI		MEMR, MOF, MPWHR, OJK, MoEF	APKENINDO, MASKEEI, HAKE, WWF	ADB, AFD, DANIDA, IFC
Capacity Building	Bank Association	METI		MOF, OJK, MEMR	APKENINDO, GBCI, CPI, HAKE	ADB, AFD, IFC, DANIDA, GIZ
Finance Mechanism	Bank Mandiri, Pt SMI, Exim Bank			MEMR, OJK, MOF, Kota Surabaya, Kota Bandung, DKI Jakarta		ADB, IFC, GIZ, AFD
Project Development	Exim Bank	Alfa Energy, METI, SES	Ciputra and Sinarmas Group	MEMR	GBCI	JCM, DANIDA, AFD

3.1. Financial institutions

Banks dominate the financial market in Indonesia. Government and commercial bond markets only represent 13% and 2% of GDP respectively, compared with an East Asian average of 58% and 21% respectively. Due to a recent tax amnesty grant from the Indonesian government more capital is available to banks for investments.¹

Banks are currently the main investors into EE projects in Indonesia, via corporate finance to existing customers. Very limited funds appear to be provided directly to technology providers. Usually, 30-50% equity is required from customers, which can operate as a barrier.² Eight banks³ are participating in a first movers programme on sustainable finance, which is focused on developing sustainable finance guidelines for domestic banks. Further, domestic banks Bank Mandiri, Exim Bank and PT SMI have been involved in concessional lending efforts for clean energy and energy finance. However, up to today, no EE project in the commercial building sector has been financed by these credit lines.⁴

Barriers:

- **Strict collateral requirements:** Most banks have strict internal credit policies which require the provision of conventional collateral (i.e. physical assets) and does not allow EE savings to be used as collateral. Banks generally require the clients to provide collateral for the project that covers 80% -120% of the project volume, depending on the perceived risk of the project. In practice, this means that EE equipment purchased using bank credit can be considered as collateral, but without including EE savings this does not tend to cover the required 80%-120%;
- **Project development and transaction costs:** For many banks, EE is unattractive due to the small size of the projects. Financial institutions mentioned the small amount of EE projects as one of the main barriers for special consideration in their lending businesses.
- **Lack of information:** A lack of reference projects and lack of reliable information on EE technologies causes banks to assess the risk of such projects too high and provide higher lending rates.

3.2. Project developers/ESCOs

In Indonesia most EE project developers and domestic ESCO firms are small engineering companies that provide services to industry and buildings to identify EE potential in their operations. Usually they do not have big collateral/assets. Also, there is no strict differentiation between technology providers and ESCOs.⁵

Barriers:

- **Availability of Funds:** Project developers/ESCOs mentioned access to finance as the number one barrier.⁶ One of the four interviewed project developers/ESCOs had some funding via their private shareholder company. Another technology provider had access to limited debt finance.⁷ Lack of collateral has been mentioned as the main barrier to access finance.⁸
- **Limited capacity:** Interviewees noted that many project developers/ESCOs are still in need for capacity building in the preparation of 'bankable' projects. For example, Investment grade audits (IGAs), which are detailed EE proposals, including financial modelling and calculations are not carried out regularly. Only ten public available IGA examples could be found.⁹

3.3. Commercial building owners:

Commercial buildings/apartments are mainly owned by big Indonesian property groups (e.g. Djarum; Summarecon, Lippo, Ciputra Group, Sinarmas Group, etc.). Some office buildings are also owned by state-owned enterprises. For example, Pertamina and Telkom are such companies. 1 Smaller malls might also have EE potential but they do not have capital to invest. Below, the main barriers for EE finance in commercial buildings/apartment blocks are summarised:

Barriers:

- An unwillingness to use their own credit lines on an EE project as it is not related to their core business and does not have a large enough economic impact on operational costs. Electricity costs make only up of 15% of operational costs in a commercial building and even though 10-35% of electricity reduction might be possible that is still only a small percentage of overall operational costs.
- A lack of trust in and experience with external service providers. Commercial building owners mistrust project developers and ESCOs to provide third party finance. This issue was mentioned by 3 of the 5 interviewed project developers/ESCOs, and it was noted some scam ESCOs have ruined the collaborations with commercial building owners. 2

However, some interviewees mentioned that high profile office buildings and malls use EE projects for image purposes. Also, it was noted that recent increases in electricity prices might change the economics of EE projects in the future. 3

3.4. Indonesia's national and local governments:

The Ministry of Energy and Mineral Resources (MEMR) is responsible for EE regulations and standards and oversees the sectoral effort to meet the energy conservation target set by the National Energy Policy. Further, it has been involved in several capacity building measures for ESCOs and also were involved in the development of financial mechanisms to support EE in the past.

OJK in 2011 published sustainable banking guidelines and is expected to pass a mandatory regulation on sustainable financing. The Ministry of Finance is responsible for fiscal incentives and also to approve any public finance mechanisms such as funds. Further, it facilitates collaborations with international development banks. The Bank of Indonesia also provides guidance to banks on internal credit policies of banks.

Local governments have been asked by the Ministry of Public Works to implement the green building standards and city of Bandung and Surabaya intend to implement tax incentives for building owners who implement the green standards in the commercial building sector.

Barriers:

- Unclear impact of city-wide green building tax incentive on local government budgets: One interviewee mentioned that currently the legislation in the city of Bandung has not been implemented as the local government is still evaluating the financial impacts of a tax incentive. Further support could be needed.¹
- Political changes: One of the reasons why an energy efficiency fund discussed in 2015 was not passed, was because the Minister of Finance had been replaced. This is a common phenomenon in Indonesia. The Minister of Energy was replaced three times in 2016. Given these circumstances long term public financial mechanisms might be challenged.
- Strict investment criteria hinder investments into priority areas of government that could lead to broader good: Due to internal lending guidelines which focus on collateral and characteristics of companies EEF is hindered. Banks are required to develop internal credit guidelines which are particularly focused on corporate finance and thus require collateral from the lender (Law No. 27/1995 and BOI No. 9/2007. EE savings cannot be accounted as collateral. Given that currently the most willing investors into EEF in commercial buildings are small engineering firms (project developers/ESCOs) this poses a problem. Further, the lending guidelines recommend not to lend to companies who are not currently meeting environmental standards. However, these might be the companies that have high EE potential.

3.5. Non- government organisations (NGOs)

Energy efficiency finance is supported by NGOs. The GBCI has implemented several EE reference projects in the public building sector. HAKE and MAASKEI are two institutions who have carried out trainings for project developers. Currently they are preparing for an IGA training.

3.6. International development organisations

International development organisations are currently the main drivers for EEF in Indonesia. The focus has been on provision of funds via concessional credit lines. However, half of all EEF credit lines or funds have failed to achieve their objectives.

Appendix II describes the roles and responsibilities of each stakeholder involved in more detail.

Section IV: Potential Next Steps

This study lays the ground for a facilitated discussion that will take place with the relevant stakeholders at the Incubator stakeholder forum in Jakarta on August 8th of 2017. This discussion will aim at identifying projects to further support EEF in Indonesia in the built environment.

Table 6 below summarises the main identified gaps for identified by the interviewees and associated potential next steps for further discussion.

Table 6: Private/public blended support mechanism and financial incentives in Indonesia

Barriers	Current activities to overcome the challenges	Gaps	Potential next steps
Banks/ Other financial institutions			
Strict collateral requirements	OJK 2014: Sustainable roadmap finance for Indonesia / GIZ 2016– Project finance	Operationalisation of the guideline needs to happen. Further, guidelines from the Bank of Indonesia on internal credit policies need to be loosened to allow project developers/ ESCO to access loans.	Develop guidelines for EE financing that might loosen current collateral requirements so that Energy efficiency projects could receive financing.
Lack of EE technology Information	Minimum performance standards have been developed. However, it is unclear which companies meet these standards	no trusted reference for EE technologies benchmarking is available in Indonesia	Develop a technology benchmarking mechanism to provide reliable information for building owners and financial institutions regarding EE technologies
Lack of information on project references	MEMR has conducted some IGA projects	Public information about results and financial performances of these projects	Reference projects could build trust
Project development and high transaction costs	Some trainings by NGOs	Very limited support for project pipeline development and bundling of EE projects by the EE consultants/project developers	Capacity building to project developers regarding project pipeline preparation and formulation of bankable project proposals

Table 6: Private/public blended support mechanism and financial incentives in Indonesia

Barriers	Current activities to overcome the challenges	Gaps	Potential next steps
Project developers/ESCOs			
Availability of Funds	Currently only JCM active.	Lack of Public/private finance mechanism that lowers the risks of banks to invest into EE projects and to project developers	Develop a guarantee mechanism, that strengthens banks trust to lend to technology providers/ESCOs
Lack of capacity to prepare bankable business cases	Development of IGA training via HAKE	Dialogue between banks and project developers how to IGAs and how to bundle projects and what details are exactly needed	Expand training activities and combine it with creating reference projects
Commercial building owners			
Not seen as core business investment	Tax incentive in selected cities if green building is built	Limited awareness of the importance of EE and economic possibilities. EE has not been realised yet as a competitive advantage	Operationalisation of tax incentive; other investment incentives to building owners
Mistrust to project developers	ESCO Law and public registration	Quality assurance and certification	Registration of ESCO firms and further capacity building

Interviewees agreed that reference projects are crucial to building trust and confidence from banks and building owners and are therefore urgently needed¹. Considering the current concessional loan via PT.SMI and AFD, a commercial building project could be developed for implementation experience². Another in-depth scanning of the financial institution landscape may also identify other financial institutions (e.g. leasing or family investors) or international organisations (e.g. KEMCO, JCM etc.) that could engage in such activities.

Potential solutions to unblock those barriers and enable the acceleration of energy efficiency finance in the Indonesian commercial buildings sector could include:

In the short term:

- Use running concessional funding from AFD and JCM to create reference projects that target EE in the commercial building sector. PT. SMI, supported by AFD has a current credit line to support low carbon investments and it could be discussed whether a project pipeline for retrofits in commercial buildings could be developed
- Capacity building for EE project developers How to prepare project pipelines and to formulate bankable project proposals
- Support local government incentives (e.g. green tax incentive of Bandung)
- Develop a technology benchmarking mechanism to provide reliable information for building owners and financial institutions regarding EE technologies
- Strengthen the efforts to develop information on reliable technology providers/ESCOs and assist by providing standard energy performance contracts.
- Investigate how financial guidelines could be adapted to be more conducive for EE finance. For example, other countries have loosened the regulations for collateral requirements in areas of government priority. For example, India has included renewable energy investments into their priority sector lending guidelines of the Reserve Bank of India.¹

In the longer-term:

- Develop a financial risk reducing mechanisms such as guarantee/insurance to possibly provide energy consultant/project developers with access to finance (See box for an example in Mexico)
- Develop long-term concessional finance via a public fund to finance energy efficiency projects in Indonesia directly, using potential financiers like GCF, AFD, IFC, ADB
- Consider mandatory sustainable investment practices that require financial institutions to invest into green projects.

These findings and potential solutions will be further discussed at the Incubator stakeholder forum in Jakarta on August 8th.

Box : Energy Savings Insurance in Mexico

Institution:

The Global Innovation Lab for Climate

Finance:

20-80million USD through 2020 (75% from private investors)

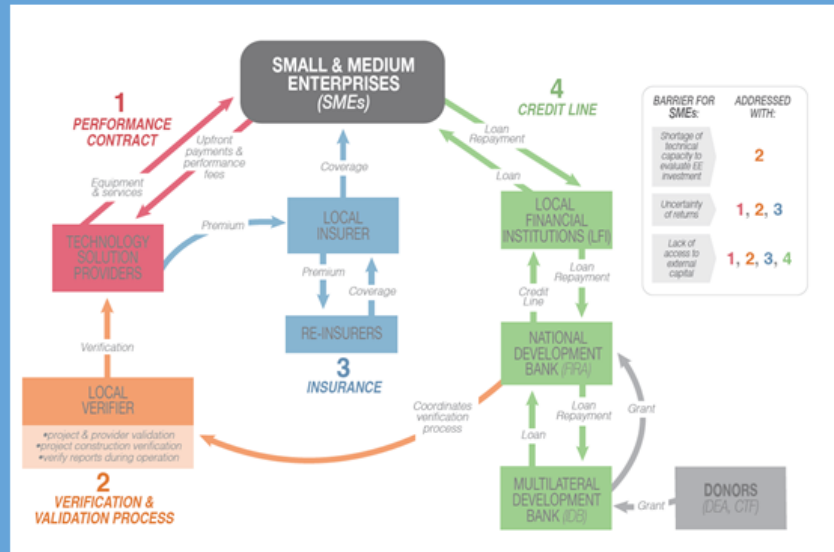
How it works:

A donor supplies funding which pays for the loan
The loan allows for the purchase of energy efficiency technology and Energy Saving Insurance (ESI)

Positive outcomes expected from pilot program

190 projects through 2020

increased sales for energy efficiency equipment providers by 10-20%



References

- ADB, 2013. Same energy, more power: accelerating energy efficiency in Asia, Manila, Phillipines: Asian Development Bank.
- APEC, 2005. Thailand's energy efficiency evolving fund: a case study, Bangkok, Thailand. Available at: [https://www.climate-eval.org/sites/default/files/evaluations/531 Thailand's Energy Efficiency Revolving Fund.pdf](https://www.climate-eval.org/sites/default/files/evaluations/531%20Thailand's%20Energy%20Efficiency%20Revolving%20Fund.pdf) [Accessed July 10, 2014].
- Carbon, L. & Programme, S., 2015. A Coherent Fiscal Policy Framework for Promoting Renewable Energies and Energy Efficiency in Indonesia Final Report Inquiries Regarding this Paper, Available at: <http://www.vivideconomics.com/wp-content/uploads/2015/10/34a-Final-Report-Consolidated-Renewable-Energy-and-Energy-Efficiency-English.pdf>.
- Crossley, D. et al., 2012. Best practices in designing and implementing energy efficiency obligation schemes, Stockholm. Available at: https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwj_IGk44LKAhVirKYKHZ24DBgQFggcMAA&url=http://www.raponline.org/document/download/id/5003&usg=AFQjCNE_JsXThQJCQzhttps://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&.
- DeT' serclaes, P., 2010. Money matters: mitigating risks to spark private investment in energy efficiency, Paris, France: OECD/IEA.
- Dixon, R.K., Scheer, R.M. & Williams, G.T., 2011. Sustainable energy investments: contributions of the global environment facility. *Mitigation and Adaptation Strategies for Global Change*, 16(1), pp.83– 102.
- Hutapea, M., 2014. BREAKTROUGH POLICIES NEEDED TO SPEED UP THE IMPLEMENTATION OF ENERGY EFFICIENCY AND CONSERVATION. Institute for Industrial Productivity, 2015. Thailand policies. Industrial Efficiency Policy Database. Available at: <http://iepd.iipnetwork.org/search/results/Thailand>.
- Ismail, M.S., 2015. SUMMARY OF INDONESIA'S , (12).
- Kolstad, L., 2016. Energy efficiency finance for commercial buildings: insights from lenders, Washington DC, United States of America. Available at: <http://www.imt.org/resources/detail/energy-efficiency-finance-for-commercial-buildings-insights-from-lenders>.
- Limaye, D.R. et al., 2012. Financing industrial energy efficiency in India: lessons learned and directions for the future financing, Washington, United States of America.
- Link, 2017. Link REIT's Green Bond: How we got it done.
- MacLean, J.C. & Purcell, D.H., 2014. Strategies for energy efficiency finance, Montpelier, United States of America. Available at: <http://www.raponline.org/document/download/id/7451>.
- Radschinski, J., 2016. Climate & SDG aligned finance & the Paris Agreement.
- Reserve Bank of India, 2015. Reserve bank of India notifies renewable energy under priority sector lending. *CleanTechnica*. Available at: <http://cleantechnica.com/2015/04/28/reserve-bank-india-notifies-renewable-energy-priority-sector-lending/> [Accessed November 24, 2015].
- Selmet, N., 2012. Plugging the energy efficiency gap with climate finance, Paris, France: OECD/IEA. Available at: [http://www.indiaenvironmentportal.org.in/files/file/Plugging the energy efficiency gap with climate finance.pdf](http://www.indiaenvironmentportal.org.in/files/file/Plugging%20the%20energy%20efficiency%20gap%20with%20climate%20finance.pdf).
- Streitferdt, V., 2016a. Optimising energy efficiency finance in emerging economies in Southeast Asia. , p.273.
- Streitferdt, V., 2016b. Optimising energy efficiency finance in emerging economies. University of Technology Sydney. Available at: <http://hdl.handle.net/10453/90249>.
- Taylor, R.P. et al., 2008. Financing energy efficiency: Lessons from Brazil, China, India and beyond, Washington DC, United States of America: The World Bank.
- Taylor, R.P., 2012. Next steps for financing energy efficiency in China, Rockville, United States of America. Available at: <http://www.iipnetwork.org/RPTaylor-NextStepsEEFinancingChina.pdf>.
- Upadhyaya, P., 2010. Is emission trading a possible policy option for India? *Climate Policy*, 10(5), pp.560– 574. Available at: <http://www.tandfonline.com/doi/abs/10.3763/cpol.2010.0105> [Accessed April 17, 2012].
- Venugopal, S., 2012. Moving the fulcrum: a primer on public climate financing instruments used to leverage private capital, Washington DC, United States of America. Available at: http://pdf.wri.org/moving_the_fulcrum.pdf.
- Wattana, S., Sharma, D. & Vaiyavuth, R., 2008. Electricity industry reforms in Thailand: a historical review. *GMSARN International Journal*, 2(2), pp.41– 52.

APPENDIX I: List of abbreviations

ADB	Asian Development Bank
AFD	French Development Agency
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of South East Asian Nations
DANIDA	Denmark's development cooperation
EE	energy efficiency
EEF	energy efficiency finance
EERF	Energy Efficiency Revolving Fund
ESCO	energy service company
GEF	Global Environment Facility
GHG	greenhouse gas
GIZ	German technical development cooperation
IFC	International Finance Corporation
IMF	International Monetary Fund
KfW	Kreditanstalt für Wiederaufbau
Ktoe	kilotonne of oil equivalent
kWh	kilowatt hour
MECs	Mechanical, electronic construction companies
NAMA	nationally appropriate mitigation action
RE	renewable energy
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation
USAID	US Foreign Assistance programme

Appendix II: List of Interviewees

Stakeholder	#
Project developers (Facilitators, ESCOs, consultants) (1_PD; 3_PD; 4_PD; 5_PD; 19_PD)	5
Financial institutions (with EE portfolios) (6_F;16_F)	2
Government (EE and finance related officials) (9_G;2_G;11_G)	3
International (organisations supporting EEF) (14_IO; 10_IO; 7_IO;13_IO; 12_IO; 17_IO; 18_IO)	7
Independent EEF Consultants (5_IC)	1
Total	18

APPENDIX III: Key Actor in energy efficiency finance in Indonesia

Institution	Description
Financial Institutions	
Bank of Indonesia	Issues credit lending guidelines.
Bank Mandiri	Largest Bank in Indonesia. It established green credit line in cooperation with AfD to finance renewable energy and energy efficiency project
Indonesia Exim Bank	Established EEPF Program with ADB to finance EE projects carried out by export-oriented industries
PT Sarana Muti Infrastruktur (SMI)	A financial institution under MoF, finance infrastructure, including green energy infrastructure and energy conservation project. PT SMI is an accredited entity to Green Climate Fund (GCF)
Project developers/ESCOs	
Synergy Efficiency Solutions	ESCO company who has financed projects via international investors.
Indonesian Renewable Energy Society (METI)	ESCO company who is state-owned and only ESCO registered with the Ministry of Energy
Alfa Energy	ESCO company member of the ESCO association and also funding EE projects via their own credit line. i
Government	
Ministry of Energy and Mineral Resources (MEMR)	Main policy maker in energy sector: Implements national-wide energy efficiency strategy, develops standards and guidelines, monitors energy efficiency policy and measures, and provides technical assistance to local government.
Ministry of Public Works and Human Settlement	Main policy maker in enforcing green buildings standards and thus are the source of incentives such as the green building tax.
Fiscal Policy Agency of Ministry of Finance (MoF)	Main policy maker in public finance. Has authority to issue fiscal and financial support facilities for renewable energy and energy efficiency and establish energy efficiency financing instruments.
Financial Services Authority (Otoritas Jasa Keuangan/ OJK)	Develops regulations on Sustainable Finance Roadmap, and issues guidelines on energy efficiency financing for financial institutions
Local Government	
District Government of Bandung	Issued the regulation on Green Building code tax incentive scheme in 2016, assisted by IFC
District Government of Surabaya	Prepares also a green building tax incentives assisted by IFC.

Institution	Description
Non-Governmental Organization	
Asosiasi Perusahaan Penunjang Konservasi Energi Indonesia (APKENINDO)	An association of technology providers, energy services companies, and consultants on energy efficiency. APKENINDO is dialogue partner of government on energy conservation. It conducts capacity building for its members also on energy efficiency finance issues.
Himpunan Ahli Konservasi Energi (HAKE)	Association of energy efficiency professionals, provides service in energy efficiency (e.g. energy audit), provides training and certification on energy efficiency standards and bankable proposal development.
Masyarakat Konservasi dan Energi Efisiensi Indonesia (MASKEEI)	Association of professional technology providers and policy-makers in energy efficiency. Conducts training and seminars on energy efficiency, facilitates policy dialogue with the APEC member economy. Started to also do capacity building in energy efficiency finance.
Green Building Council Indonesia (GBCI)	Association of green building professionals. Has implemented EE projects in public building demonstration projects. .
International Donors	
Asia Development Bank (ADB)	Provides technical assistance on ESCO regulation, Energy Efficiency Project Financing with Indonesia Exim Bank, pilot project on EE street lighting
International Financial Cooperation (IFC)	Supports green building code regulation in Jakarta, Bandung and Makassar; established green building certification system "EDGE". It is administered by the Green Building Council of Indonesia.
DANIDA (Danish)	Promotes energy efficiency in industry and commercial buildings, and established energy efficiency clearing house which provides information on EE (EECHI), and renewable energy and energy efficiency investment clearing house (LINTAS EBTKE)
AFD	Provides credit facilities and capacity building for Bank Mandiri and now PT. SMI to finance renewable energy and energy efficiency projects.
Joint Crediting Mechanism (JCM)	Joint initiative of the governments of Japan and Indonesia in financing up to 50% of piloting GHG mitigation projects. One of the pilot projects is to implement energy efficiency cooling systems in shopping malls in Surabaya.
GIZ	Promotes Green Chiller technology for cooling systems for building and industrial applications, and conducts pilot projects on Green Chiller.